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PREDICT EPHEMERAL AND PERENNIAL RANGE QUANTITY AND QUALITY  
DURING NORMAL GRAZING SEASON

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Type I Progress Report for Period 1 March 1973 - 30 April 1973

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Prepared for:

Goddard Space Flight Center  
Greenbelt, Maryland 20771

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Type I Progress Report  
ERTS-A

- a. Title: Predict Ephemeral & Perennial Range Quantity & Quality  
During Normal Grazing Season

ERTS-A Proposal No.: SR 147

- b. GSFC ID No. of P.I.: IN 417

- c. Statement and explanation of any problems that are impeding the progress of the investigation:

Analysis of satellite imagery has been slow for two reasons. I am to receive imagery taken over California and Arizona sites after February 15. Receipt of imagery occurs 4 to 6 weeks after the date of the satellite pass. No imagery has been received for California sites due to heavy cloud cover. Imagery over one Arizona site is not usable because of heavy cloud cover.

- d. Discussion of the accomplishments during the reporting period and those planned for the next reporting period:

Extensive ground truth data has been taken over Arizona and California sites. This includes vegetation, soil and climatic measurements, and general reconnaissance and color and color infrared photos from low flying aircraft.

The following ERTS frames of south central Arizona have been analyzed:

28 Sep. 72	1067-17324	Color composite	1:1,000,000 scale
01 Feb. 73	1193-17333	Color composite	1:1,000,000 scale

In analyzing the two frames representing a very dry fall season and a wet late winter I have been able to do the following:

- 1) Separate three broad vegetative classes.
  - i) Areas supporting predominantly perennial vegetation - perennial type.
  - ii) Areas supporting a very thin layer of perennial shrubs such as Larrea tridentata - creosote bush, but capable of supporting abundant ephemeral plants in season - ephemeral type.
  - iii) Areas supporting a fair stand of perennials but also capable of supporting abundant ephemerals in season - ephemeral-perennial type.

- 2) Distinguish between areas producing heavy, moderate, and light stands of ephemeral forage.
- 3) Tentatively map areas of varying potential to produce ephemeral forage.

A paucity of imagery due to cloud cover has made it difficult to test usability of satellite imagery for charting plant growth and development during the growing season. I do plan, however, to attempt to do this on the Oregon site and to follow the drying period in Arizona and California during April and May as imagery becomes available.

I have been fairly successful in producing my own color composites from 9"x9" positive transparencies using a specially designed light table, filters, and a camera capable of a triple exposure. Imagery produced in this manner is usable for purposes of this study. However, I intend to request GSFC color composites for selected dates for comparison. Based on several NASA composites I have seen, I am sure that much more detail can be obtained from them.

The following frame of southern California was analyzed:

01 Oct. 72      1070-17495-6      1:250,000 scale

Using this imagery I have been able to delineate polygons, based upon varying shades of gray, which studies have shown correspond to broad soil types and plant communities. It appears that satellite imagery coupled with extensive field checks will afford a means of building an accurate regional soil and vegetation map for the California desert. Testing of this method is continuing.

e. Discussion of significant scientific results and their relationship to practical applications or operational problems including estimates of the cost benefits of any significant results:

None at present.

f. A listing of published articles, and/or papers, pre-prints, in-house reports, abstracts of talks, that were released during the reporting period:

None.

g. Recommendation concerning practical changes in operations, additional investigative effort, correlation of effort and/or results as related to a maximum utilization of the ERTS system:

The ERTS system will never really be usable to the Bureau of Land Management (BLM) until three major problems are solved.

- 1) Data must be received by resource managers within 1 week of the satellite overpass.
- 2) Imagery must be in the form of black & white and color composite paper prints in contact and enlargement size (up to 20"x20").
- 3) Imagery must have been a direct result of computer tapes - third, fourth, etc. generation products are much less useful for analysis.

h. A listing by date of any changes in Standing Order Forms: /

None during this period.

i. ERTS Image Descriptor forms:

None.

j. Listing by date of any changed Data Request forms submitted to Goddard Space Flight Center/NDPF during the reporting period:

None.

k. Status of Data Collection Platforms (if applicable): N/A

cc:  
WO, 420  
WO, 510

*Gordon Bentley*